

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference 152279-273	FOR FURTHER ACTION		See item 4 below
International application No. PCT/JP2005/003155	International filing date (<i>day/month/year</i>) 25 February 2005 (25.02.2005)	Priority date (<i>day/month/year</i>) 01 March 2004 (01.03.2004)	
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237			
Applicant TOKYO ELECTRON LIMITED			

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).
2. This REPORT consists of a total of 5 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input checked="" type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland		Date of issuance of this report 29 November 2006 (29.11.2006)
Facsimile No. +41 22 338 82 70		Authorized officer Masashi Honda
		e-mail: pt08@wipo.int

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

TRANSLATION
PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing
(day/month/year)

Applicant's or agent's file reference

152279-273

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/JP2005/003155

International filing date (day/month/year)

25.02.2005

Priority date (day/month/year)

01.03.2004

International Patent Classification (IPC) or both national classification and IPC

Applicant

TOKYO ELECTRON LIMITED

1. This opinion contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|--|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the opinion |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input checked="" type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/JIP

Authorized officer

Facsimile No.

Telephone No.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2005/003155

Box No. I

Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2005/003155

Box No. IV Lack of unity of invention

1. ☐ In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has:
- ☒ paid additional fees
- ☐ paid additional fees under protest
- ☐ not paid additional fees
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- ☐ complied with
- ☒ not complied with for the following reasons:

The subject matters of claims 1-7 and 15 are characterized by the technique of using a Cu carboxylic acid complex or a derivative thereof as a raw material. On the other hand, the subject matters of claims 8-14 and 16 are characterized by the technique of controlling the introduction of a reducing gas. Since there is no technical relationship among these subject matters involving one or more of the same or corresponding technical features, these subject matters are not so linked as to form a single general inventive concept.

4. Consequently, this opinion has been established in respect of the following parts of the international application:
- ☒ all parts
- ☐ the parts relating to claims Nos. _____

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/JP2005/003155

Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	2-16	YES
	Claims	1	NO
Inventive step (IS)	Claims	2-16	YES
	Claims	1	NO
Industrial applicability (IA)	Claims	1-16	YES
	Claims		NO
2. Citations and explanations:			
<p>Document 1: JP, 63-5424, B2 (Ruh Chemie AG), 03 February, 1988 (03.02.88)</p> <p>Document 2: Per Martensson et al., "Growth and Selectivity in the Cu(III)-2,2,6,6-tetramethyl-3,5-heptanedionate/H₂ Process", J. Electrochem. Soc., 1998, Vol. 145, No. 8, pages 2926-2931</p> <p>Document 3: Mikko Utriainen et al., "Studies of metallic thin film growth in an atomic layer epitaxy reactor using M(acac)₂ (M=Ni, Cu, Pt) precursors", Applied Surface Science, 2000, Vol. 157, pages 151-158</p> <p>Document 4: JP, 2003-193233, A (Tokyo Electron Ltd.), 09 July, 2003 (09.07.03)</p> <p>(1) The subject matter of claim 1 does not appear to be novel in view of document 1 cited in the ISR. The technique of "forming a Cu film on a substrate through CVD using a raw material including a Cu carboxylic acid complex or a derivative thereof" described in claim 1 is disclosed in the claims of document 1.</p> <p>(2) The subject matters of claims 2-7 and 15 appear to be novel since these matters are not disclosed in any of the documents cited in the ISR. In particular, a technique of using a raw material including a Cu carboxylic acid complex or a derivative thereof in a method for forming a film in which a process for supplying the raw material to a substrate and a process for supplying a reducing gas to the substrate after the supply of the raw material are performed alternately, is not disclosed in any of the documents.</p> <p>(3) The subject matters of claims 8-14 and 16 appear to be novel since these matters are not disclosed in any of the documents cited in the ISR. In particular, a method for forming a film in which a process for supplying the raw material to a substrate and a process for supplying a reducing gas to the substrate after the supply of the raw material are performed alternately, in which the method comprises, in a early phase of film-forming, a first film-forming period for performing said two processes alternately for a first period comprising a period T1 during which the reducing gas is supplied, and a second film-forming period succeeding the first film-forming period for performing said two processes alternately comprising a second period T2, which is shorter than T1 during which the reducing gas is supplied, is not disclosed in any of the documents.</p>			